

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/857,845

REMARKS

Claims 32-72 are pending in the present application. Claims 32 and 38 have been amended. No new matter has been added. Support for the amendments to Claims 32 and 38 is identified below. Accordingly entry of the present Amendment is requested.

Specifically, Claim 32 has been amended to recite that the cross-linked polymer is swellable in water such that the water content of the polymer when fully swollen in deionized water is in the range 10 to 50% by weight. Support for this amendment is provided by, for example, page 9 of the specification, lines 12 to 13. Claim 32 has also been amended to specify that a) is present in an amount of at least 5 mole %, b) in an amount of at least 10 mole % and c) is present in an amount in the range of 0.01 to 10 mole % based on total monomer. Support for this amendment is provided by, for example, page 8 of the specification, line 32, page 8, line 34 and page 9, line 2, respectively.

Referring to page 2 of the Office Action, the Restriction Requirement has been made final.

However, Applicants respectfully submit that, in addition to the claims identified in the Office Action, Claims 33-36, 39-43, 62, 63, 66 and 67 also read on the elected species.

In Claim 33, for instance, R⁴ is benzyl or phenyl. In the elected species (of polymer), the aromatic monomer has R⁴ as benzyl. Claim 33 therefore clearly reads on the elected species.

Similarly in Claim 34, each of Y and Y² represent methacrylate groups, namely groups of the formula CH₂=CR²COA in which R^x is methyl and A is O.

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With reference to Claim 35, in one of the cross-linking monomers in the elected species, the group R⁹ is a bisphenol A moiety, which is an aromatic group. Claim 35 therefore reads on the elected species.

With regard to Claim 36, the elected species comprises a mixture of cross-linking monomers, in one of which R⁹ is an aliphatic group, namely 1,2-ethylenedioxy- group. Claim 36 therefore reads on the elected species.

Claim 39 relates to the molar amounts of zwitterionic monomer. The Examiner had not requested an election of the molar amount of monomers in the elected species. The claim must therefore read on the elected species in that the elected species may well include the specified molar amounts of MPC. In fact the preferred polymer (had Applicants been asked to elect the ratios) does have an amount of MPC within the range specified in Claim 39.

With regard to Claim 40, again this claim refers to the molar amount of aromatic group containing monomer. For similar reasons this claim clearly reads on the elected species. The same is true for Claim 41 which relates to the level of cross-linking monomer.

With regard to Claim 42, as well as Claim 43, these claims are directed to preferred zwitterionic group general formulae. With regard to Claim 42, the monomer of the elected species comprises a group of the general Formula IV in which X⁴ and X⁵ each represent -O- and W is a group comprising an ammonium cationic group and an alkylene group linking the cationic moieties and the anionic moiety which is a C₂ alkylene group. With regard to Claim 43, the group X is a group of Formula V in which m is 2 and R¹⁶ are each C₁ alkyl.

With regard to Claim 62, Applicants refer to the above comments regarding Claim 35. With regard to Claim 63, Applicants refer to the above comments regarding Claim 36. With

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regard to Claim 66, the elected zwitterionic group is within the scope of W^+ which is $W^1-N^+R^{14}{}_3$, in which W^1 is C_2 alkylene, and R^{14} is the same and is methyl. With regard to Claim 67, since each R^{16} is methyl, the claim reads on the elected species.

In view of the foregoing, reconsideration of the withdrawn claims is requested.

Claims 32, 37, 38, 64 and 65 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

In response, Claim 32 has been amended to correct the error noted by the Examiner.

Accordingly, withdrawal of the rejection is requested.

Claims 32 and 65 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,270,415 to Sulc *et al.* taken with U.S. Patent No. 5,290,892 to Namdaran *et al.* Additionally, Claims 37, 38 and 64 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sulc *et al.* and Namdaran *et al.* further in view of U.S. Patent No. 5,502,139 to Toh *et al.*

Applicants respectfully traverse these rejections for the following reasons.

Sulc does not teach an aromatic group containing comonomer in the polymer. The Examiner has suggested that it would have been obvious to add aromatic group containing comonomers to the copolymers of Sulc in the expectation of enhancing refractive index, flexibility and transparency because Namdaran teaches such comonomers in the same class of copolymers. Applicants respectfully disagree and do not accept that the types of copolymer defined by Sulc and by Namdaran are the same. However, without admitting that the rejection is correct and in order to distinguish between these types of copolymers, the claims have been amended to specify the maximum swellability in deionized water. In Sulc, the polymer must be

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highly water-swellable. In the worked examples, all of the polymers have a swellability such that the hydrated polymer contains more than 50% in isotonic saline. The tests in Sulc are carried out in isotonic saline. If the swellability were to be determined in deionized water, the level of the water would certainly be no less than when swollen in saline, and would probably be a higher value. Accordingly, the upper limit of 50% included in the claim distinguishes the polymers from Sulc.

The polymers in Namdaran are not water swellable. Namdaran does not disclose any water swellability values for the polymers. However, the very fact that the mechanical characteristics and refractive index of the polymers are determined without the polymers being contacted with any aqueous solution indicates that contact with water would not be expected to change the properties and thus that the polymers would not swell. From knowledge of the monomers used, it can be seen that the polymers would certainly not be expected to be water swellable to any measurable degree. Consequently, the claims are differentiated from the copolymers of Namdaran by reference to the minimum water content of 10% when fully swollen. This difference is due to the presence in the claimed copolymers of the zwitterionic monomer.

Further, the copolymers of Sulc and Namdaran are distinguishable from one another. First, the polymers of Sulc and Namdaran show different water swellability properties. Furthermore, the copolymers of Namdaran include aromatic monomer and cross-linker but do not include an ionic monomer, still less a zwitterionic monomer. While Namdaran describes copolymers, the monomers are all aromatic type monomers. In Sulc by contrast, comonomers

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are described of aliphatic non-ionic compounds and ionic compounds, either zwitterionic monomers or a blend of anionic and cationic monomer.

NAMDARAN does not describe replacing any particular monomers with the aromatic monomers used in his polymers. He does not therefore disclose that any improved properties, in terms of optical or physical properties would be achieved by replacing the comonomers of SULC by the aromatic comonomers he describes. Since NAMDARAN's polymers are essentially water-unswellable, and those of SULC must have a high water swellability, and since NAMDARAN has no motivation to utilize aromatic comonomers in place of the aliphatic comonomers of SULC, there is no motivation to combine the teachings.

In view of the foregoing, Applicant submits that Claim 32 would not have been *prima facie* obvious over the combination of references.

As mentioned above, the Examiner has further rejected Claims 37, 38 and 64 over the same references in combination further with TOH. Claim 37, 38 and 64 each require that a mixture of cross-linking agents be used. However, TOH relates to different types of copolymers from each of SULC and of NAMDARAN. TOH describes casting mixtures which are formed primarily from di- or higher-functional ethlenically unsaturated monomers. There is no disclosure of the presence of monofunctional monomers, still less of aromatic monofunctional monomers or ionic monofunctional monomers, still less zwitterionic monomers. Without admitting that this rejection is appropriate and in order to better distinguish the present invention from TOH, the cross-linking monomer, is specified as being present in an amount of a range 0.01 to 10% based on total moles of monomer. TOH uses at least 90% of cross-linking monomer, which makes his polymer a totally different type to both SULC and NAMDARAN.

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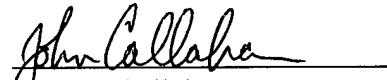
Further, Applicants respectfully submit that the worked examples of the present application show a particular advantage in the mixed cross-linker system.

In view of the foregoing, withdrawal of the rejections is requested.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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PATENT TRADEMARK OFFICE

Date: July 14, 2003



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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

32. (Amended) A crosslinked polymer obtainable by radical polymerisation of ethylenically unsaturated monomers including

a) a zwitterionic monomer of the general formula I

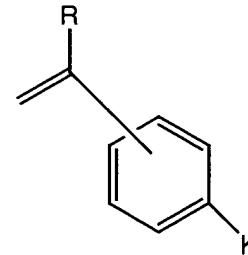
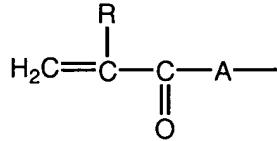


wherein

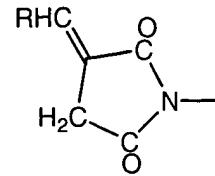
B is a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene chain optionally containing one or more fluorine atoms or, if X or Y contains a terminal carbon atom bonded to B, a valence bond;

X is a zwitterionic group; and

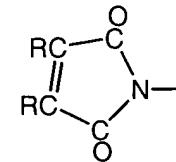
Y is an ethylenically unsaturated polymerisable group selected from the group consisting of



$\text{CH}_2=\text{C}(\text{R})-\text{CH}_2-\text{O}-$, $\text{CH}_2=\text{C}(\text{R})-\text{CH}_2\text{OC}(\text{O})-$, $\text{CH}_2=\text{C}(\text{R})\text{OC}(\text{O})-$, $\text{CH}_2=\text{C}(\text{R})-\text{O}-$,
 $\text{CH}_2=\text{C}(\text{R})\text{CH}_2\text{OC}(\text{O})\text{N}(\text{R}^1)-$, $\text{R}^2\text{OOC}\text{R}=\text{CRC}(\text{O})-\text{O}-$, $\text{RCH}=\text{CHC}(\text{O})\text{O}-$,
 $\text{RCH}=\text{C}(\text{COOR}^2)\text{CH}_2-\text{C}(\text{O})-\text{O}-$,



and



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wherein:

R is hydrogen or a C₁-C₄ alkyl group;

R¹ is hydrogen or a C₁-C₄ alkyl group or R¹ is -B-X where B and X are as defined above;

and

R² is hydrogen or a C₁₋₄ alkyl group or BX where B and X are as defined above;

A is -O- or -NR¹-;

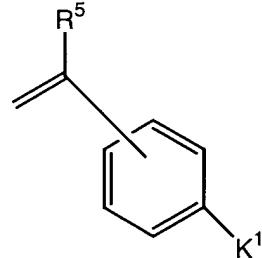
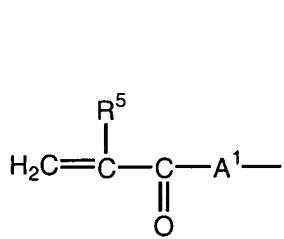
K is selected from the group consisting of -(CH₂)_pOC(O)-, -(CH₂)_pC(O)O-,

-(CH₂)_pOC(O)O-, -(CH₂)_pNR³-, -(CH₂)_pNR³C(O)-, -(CH₂)_pC(O)NR³-, -(CH₂)_pNR³C(O)O-,
 -(CH₂)_pOC(O)NR³-, -(CH₂)_pNR³C(O)NR³- (in which the groups R³ are the same or different),
 -(CH₂)_pO-, -(CH₂)_pSO₃ -, and optionally in combination with B, a valence bond and p is from 1 to 12 and R³ is hydrogen or a C₁-C₄ alkyl group;

b) an aromatic group containing monomer of the general formula II



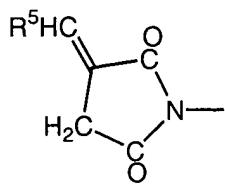
wherein Y¹ is selected from the group consisting of



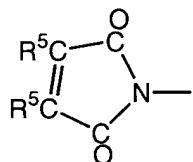
CH₂=C(R⁵)-CH₂-O-, CH₂=C(R⁵)-CH₂OC(O)-, CH₂=C(R⁵)OC(O)-, CH₂=C(R⁵)-O-,

CH₂=C(R⁵)CH₂OC(O)N(R⁶)-, R⁷OOCCR⁵=CR⁵C(O)-O-, R⁵CH=CHC(O)O-,

R⁵CH=C(COOR⁷)CH₂-C(O)-O-,



and



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wherein:

R^5 is hydrogen or a C_1 - C_4 alkyl group;

R^6 is hydrogen or a C_1 - C_4 alkyl group or R^6 is R^4 ;

R^7 is hydrogen or a C_{1-4} alkyl group or R^4 ;

A^1 is $-O-$ or $-NR^6-$;

K^1 is selected from the group consisting of $-(CH_2)_qOC(O)-$, $-(CH_2)_qC(O)O-$,

$-(CH_2)_qOC(O)O-$, $-(CH_2)_qNR^8-$, $-(CH_2)_qNR^8C(O)-$, $-(CH_2)_qC(O)NR^8-$, $-(CH_2)_qNR^8C(O)O-$,

$-(CH_2)_qOC(O)NR^8-$, $-(CH_2)_qNR^8C(O)NR^8-$ (in which the groups R^8 are the same or different),

$-(CH_2)_qO-$, $-(CH_2)_qSO_3-$, and a valence bond and [p] q is from 1 to 12 and R^8 is hydrogen or a

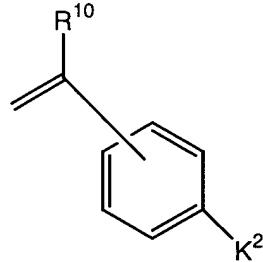
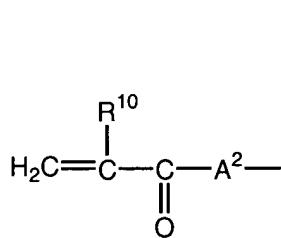
C_1 - C_4 alkyl group;

and R^4 is an aromatic group; and

c) a cross-linking monomer of the general formula III



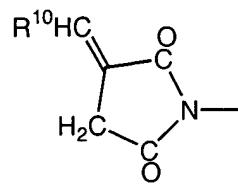
in which n is an integer of at least 2, each Y^2 is selected from the group consisting of



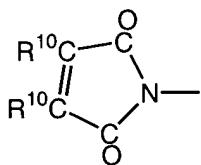
$CH_2=C(R^{10})-CH_2-O-$, $CH_2=C(R^{10})-CH_2 OC(O)-$, $CH_2=C(R^{10})OC(O)-$, $CH_2=C(R^{10})-O-$,

$CH_2=C(R^{10})CH_2OC(O)N(R^{11})-$, $R^{12}OOC R^{10}=CR^{10}C(O)-O-$, $R^{10}CH=CHC(O)O-$,

$R^{10}CH=C(COOR^{12})CH_2-C(O)-O-$,



and



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wherein:

R^{10} is hydrogen or a C₁-C₄ alkyl group;

R^{11} is hydrogen or a C₁-C₄ alkyl group;

R^{12} is hydrogen or a C₁₋₄ alkyl group;

A^2 is -O- or -NR¹¹-;

K^2 is selected from the group consisting of -(CH₂)_rOC(O)-, -(CH₂)_rC(O)O-, -(CH₂)_rOC(O)O-, -(CH₂)_rNR¹²-, -(CH₂)_rNR¹²C(O)-, -(CH₂)_rC(O)NR¹²-, -(CH₂)_rNR¹²C(O)O-, -(CH₂)_rOC(O)NR¹²-, -(CH₂)_rNR¹²C(O)NR¹²- (in which the groups R¹² are the same or different), -(CH₂)_rO-, -(CH₂)_rSO₃ - and a valence bond and r is from 1 to 12 and R¹² is hydrogen or a C₁-C₄ alkyl group;

and R⁹ is an n-functional organic group;

wherein the cross-linked polymer is swellable in water such that the water content of the polymer when fully swollen in deionized water is in the range of 10 to 50% by weight, and the zwitterionic monomer of general formula I is present in an amount of at least 5 mole %, the aromatic group containing monomer of general formula II is present in an amount of at least 10 mole %, and the cross-linking monomer of general formula III is present in an amount of 0.01 to 10 mole %, based upon total monomer.

38 (Amended): A polymer according to claim 37 in which the molar ratio of crosslinking monomer in which R⁹ is aromatic to crosslinking monomer in which R⁹ is aliphatic is in the range 10:1 to 1:10 ~~preferably 5:1 to 1:5, most preferably 2:1 to 1:2.~~